

CLAIMS

What is claimed is:

1. An electrical power generation system, comprising:
5 a transducer that generates electrical energy under dynamic mechanical loading; and
 a buffer mechanically coupled to the transducer and adapted to be mechanically coupled to a structure, the buffer facilitating the transducer to operate within a predetermined mechanical loading range to allow the electrical
10 power generation system to generate the electrical energy.
2. The system according to claim 1 wherein the buffer is stiffer than a local stiffness of the structure.
- 15 3. The system according to claim 2 wherein the buffer includes at least one of the following materials: composite, metal, fiber, or polymer.
4. The system according to claim 1 wherein the buffer is less stiff than a local
20 stiffness of the structure.
5. The system according to claim 4 wherein the buffer includes at least one of the following materials: rubber, foam, plastic or composite.
6. The system according to claim 1 further including a second buffer coupled to the
25 transducer separate from the other buffer.
7. The system according to claim 6 wherein the buffers form a seal around the transducer.

8. The system according to claim 1 further including an electrically conductive pattern electrically coupled to the transducer, the electrically conductive pattern collecting electrical energy generated by the transducer.
- 5 9. The system according to claim 8 wherein the system includes a second buffer encapsulating the transducer with the other buffer, the electrically conductive pattern including contacts exposed external from the buffers.
- 10 10. The system according to claim 8 wherein the electrically conductive pattern is disposed on a film in a layered relationship with the transducer.
11. The system according to claim 8 further including an energy harvesting circuit electrically coupled to the electrically conductive pattern and disposed in a layered relationship with the transducer.
- 15 12. The system according to claim 11 wherein the circuit and transducer are on the same layer.
- 20 13. The system according to claim 1 wherein the circuit and transducer are on different layers.
14. The system according to claim 1 wherein the buffer surrounds the transducer.
- 25 15. The system according to claim 1 wherein the transducer and buffer are in a layered relationship to each other.
16. The system according to claim 1 wherein the buffer is laminar.

17. The system according to claim 1 wherein the buffer is surface bonded to the structure.
18. The system according to claim 1 wherein the system is embedded in the structure.
19. The system according to claim 1 wherein the buffer defines at least two ends and at least one of the ends is attached to the structure.
20. The system according to claim 1 wherein the dynamic mechanical loading includes at least one of the following: strain, stress, or bending.
21. An electricity generator module, comprising:
 - a transducer that generates electrical energy under dynamic motion conditions;
 - a circuit coupled to the transducer that converts the electrical energy into usable electricity at a circuit output; and
 - a planar housing enclosing the transducer and circuit, the housing (i) allowing the transducer to be exposed to the dynamic motion conditions and (ii) providing electrical contacts coupled to the circuit output to facilitate delivery of the usable electricity for external circuitry.
22. The electricity generator module according to claim 21 wherein the housing includes a buffer coupled to the transducer that facilitates the transducer to experience the dynamic motion conditions and operate within a predefined range.

23. The electricity generator module according to claim 21 wherein the dynamic motion conditions include at least one of the following: strain, stress, and bending.
- 5 24. The electricity generator module according to claim 21 wherein the buffer is stiffer than a local stiffness of the source of the dynamic motion conditions.
25. The electricity generator module according to claim 21 wherein the buffer is softer than a local stiffness of the source of the dynamic motion conditions.
- 10 26. The electricity generator module according to claim 21 wherein the circuit is an energy harvesting circuit powered by the electrical energy generated by the transducer.
- 15 27. The electricity generator module according to claim 21 wherein the module is manufactured through a lamination process.
28. The electricity generator module according to claim 21 wherein the module is surface bonded to a structure.
- 20 29. The electricity generator module according to claim 21 wherein the module is attached to a structure.
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